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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/881,335      | 06/14/2001  | Mikko Huttunen       | 781.401USW1         | 9195             |

32294 7590 12/27/2004

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| EXAMINER |
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LEE, JOHN J

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| ART UNIT | PAPER NUMBER |
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2684

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/881,335 | <b>Applicant(s)</b><br>HUTTUNEN, MIKKO |  |
|                              | <b>Examiner</b><br>JOHN J LEE        | <b>Art Unit</b><br>2684                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 15-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23-25 is/are allowed.
- 6) ☒ Claim(s) 15-18 and 20 is/are rejected.
- 7) ☒ Claim(s) 19,21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments/Amendment***

1. Applicant's arguments/amendments received on September 29, 2004 have been carefully considered but they are not persuasive because the teaching of all the cited reference reads on all the rejected claims as set forth in the pervious rejection. Therefore, the finality of this Office Action is deemed proper.

Contrary to the assertions at pages 1 - 12 of the Arguments, claim 15 is not patentable.

The claim does not require or limit, as during examination the USPTO must give claims their broadest reasonable interpretation.

Re claim 15: Applicant argues that the combination of Wright et al. (US Patent number 6,054,894) and Cavers (US Patent number 5,049,832) do not teach the claimed invention "taking a plurality of samples at a time from a signal coming out of the transmitter". However, The Examiner respectfully disagrees with Applicant's assertion that the Wright and Cavers do not teach the claimed invention. Contrary to Applicant's assertion, the Examiner is of the opinion that Wright teaches the signal control processing and compensation estimator to extract a sample of the amplified output and samples of the two phase signals and works on samples in and gives samples out (see Fig. 3, 7, column 11, lines 63 – column 12, lines 8, and column 6, lines 33 - 67), regarding the claimed limitation. More specifically, the signal control processing and compensation estimator takes samples at a time from a signal and arranging the each sample in the look up table). Also, Applicant argues that the claimed limitation "categorizing of signal

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samples, comparing of signal samples with corresponding ideal signal values, and defining a correction parameter for each class on the basis of an average comparison result” do not teach by combining teaching of Wright and Cavers. However, The Examiner respectfully disagrees with Applicant’s assertion. Contrary to Applicant’s assertion, the Examiner is of the opinion that Wright teaches arranging the each sample in the look up table (see column 37, lines 48 – 65 and Fig. 25), and comparing the signal samples with ideal signal values (see column 38, lines 51 – 67), and also implementing calculating a adjustment parameter for each sample based on peak of average ratio of signal samples (comparing results) (see column 41, lines 59 – column 42, lines 55 and Fig. 26, 28), regarding the claimed limitation.

Applicant’s attention is directed to the rejection below for the reasons as to why this limitation is not patentable.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 15-18 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright et al. (US Patent number 6,054,894) in view of Cavers (US Patent number 5,049,832).

Regarding **claim 15**, Wright discloses that a method for defining correction parameters used in transmitter linearization executed by a predistortion method (column 3, lines 49 – column 4, lines 37 and Fig. 3, 26). Wright teaches that taking a predefined number of samples at a time from a signal coming out of said transmitter (Fig. 3, 26, column 6, lines 29 – 67, and column 40, lines 47 – column 41, lines 9, where teaches compensation estimator to extract a sample of the amplified output and samples of the two phase signals). Wright teaches that comparing the signal samples with corresponding ideal signal values (column 38, lines 32 – 67 and Fig. 25, 26, where teaches the receiver converts the RF signal down to complex baseband samples which can be compared with samples of the ideal signal). Wright teaches that defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question (column 38, lines 32 – 67, Fig. 3, and column 6, lines 55 – column 7, lines 65, where teaches extracting a sample of the amplified output and samples of the two phase signals and identify parameter corrections for each phase signal).

Wright does not specifically disclose the limitation “categorizing the signal samples into classes”. However, Cavers discloses the limitation “categorizing the signal samples into classes” (column 13, lines 8 – column 14, lines 52 and Fig. 11, 12, where teaches the variance in the output quantization error is inversely proportional to the square of the table size with class AB). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the Wright system as taught by Cavers. The motivation do so would be to achieve a method of linearizing an

amplifier to produce an amplified output sample in response to predistorted input sample for desired constant amplitude gain in communication system.

Regarding **claim 16**, Wright discloses that the categorization in above step is performed on the basis of the ideal signal corresponding to the signal sample (column 38, lines 32 – 67 and Fig. 25, 26).

Regarding **claim 17**, Wright and Cavers disclose all the limitation, as discussed in claim 15. Furthermore, Wright further discloses that above step is performed on the basis of the amplitude of the ideal signal (column 35, lines 11 – 65 and Fig. 23).

Regarding **claim 18**, Wright and Cavers disclose all the limitation, as discussed in claim 15. Furthermore, Wright further discloses that comparing the normalized amplitude of each signal sample of the class in question to the normalized amplitude of the corresponding signal fed into the transmitter (column 39, lines 45 – 58, Fig. 31, 32, and column 45, lines 35 – 58). Wright teaches that defining the ratios of these amplitude values (column 41, lines 59 – column 42, lines 16 and Fig. 26). Wright teaches that calculating the average of the ratios (column 41, lines 59 – column 42, lines 47 and Fig. 26). Wright teaches that defining the correction parameter for the class in question on the basis of the calculated average (column 41, lines 59 – column 42, lines 47 and Fig. 26).

Regarding **claim 20**, Wright and Cavers disclose all the limitation, as discussed in claims 15 and 18. Furthermore, Wright further discloses that calculating the average of the normalized amplitudes of the signal samples of the class in question and the average of the normalized amplitudes of the signals fed into the transmitter and corresponding to

the samples of the class in question (column 25, lines 8 – column 26, lines 10 and Fig. 13, 14).

***Allowable Subject Matter***

4. Claims 23 – 25 are allowed.

Claims 23 – 25 are allowable over the prior art of record because a search does not detect the combined claimed elements as set forth in the claims 23 – 25.

As recited in independent claim 23, none of the prior art of record teaches or fairly suggests that a transmitter comprises predistorter for predistorting the signal to be sent to compensate the nonlinearity of the transmitter, categorization means for categorizing into classes the plurality of signal samples taken from the signal coming out of the transmitter, and definition means, responsive to the comparison means, for defining amplitude and preferably phase correction parameters for each class on the basis of an average comparison result of all signal samples of the class in question, whereby the predistorter is arranged to use said correction parameters when predistorting the signal being transmitted, and together with combination of other element as set forth in the claims 23 – 25. Therefore, claims 23 – 25 are allowable over the prior art of records.

5. Claims 19, 21, and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record fails to disclose “comparing the normalized amplitude and phase of each signal sample of the class in question with the normalized amplitude and

phase of the signal fed into the transmitter and corresponding to the sample respectively, defining the ratios of the amplitude values and differences of the phase values, calculating the average of the ratios of the amplitude values defined and the average of the phase value differences, defining the correction parameter for the class in question on the basis of the calculated averages, and defining as the correction parameter of the class in question the correction parameter of another class, preferably the correction parameter of the closest class, or defining the correction parameter of the class in question by interpolation from the correction parameters of the closest classes containing samples” as specified in the claims.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



***Conclusion***

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications intended for entry)

Or:

(703) 308-6606 (for informal or draft communications, please label  
"PROPOSED" or "DRAFT").

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John J. Lee** whose telephone number is **(703) 306-5936**. He can normally be reached Monday-Thursday and alternate Fridays from 8:30am-5:00 pm. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, **Nay Aung Maung**, can be reached on **(703) 308-7745**. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

J.L  
December 22, 2004

John J Lee

  
**NAY MAUNG**  
SUPERVISORY PATENT EXAMINER